

NASA FACTS

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MANNED SPACECRAFT CENTER

PUBLIC AFFAIRS OFFICE
Houston, Texas

SATURN V

The first job performed by the huge Saturn V launch vehicle was sending American astronauts to the moon in NASA's Project Apollo.

This mission was accomplished with the launching on July 16, 1969, of the sixth Saturn V in an initial quota of 15 vehicles provided by the Marshall Space Flight Center and its contractors. The nine remaining Saturn V's are being used for further exploration of the moon and for placing Skylab into earth orbit.

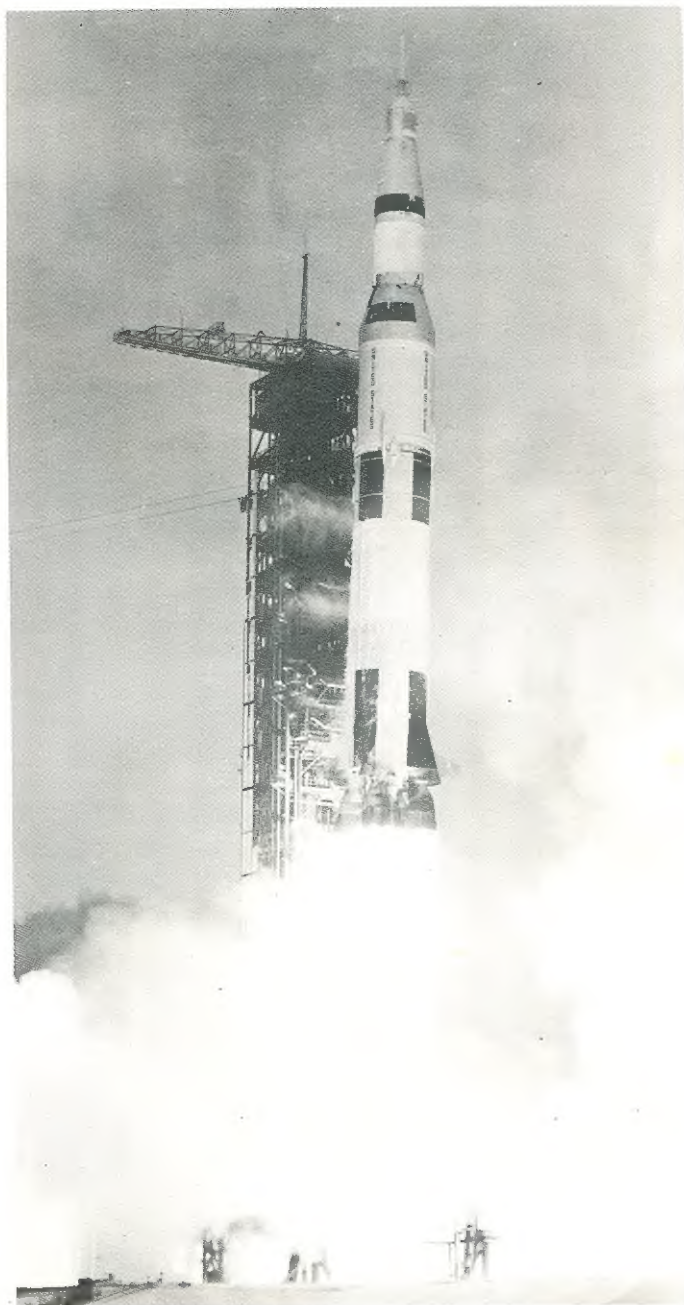
The Saturn V program is the largest rocket effort undertaken in this country. Its total cost, including completion of the 15 launch vehicles in the original quota, will be more than \$7 billion. The cost of Project Apollo through the first manned lunar landing in July, 1969, totaled \$21.3 billion, within 10 per cent of the lowest estimate made beforehand.

Manned flights to the moon will continue through 1972, with launches scheduled about every six months. During the 1972-73 period manned space flight will concentrate on earth orbital operations in the Skylab Program. Under the present flight schedule, two Saturn V's are available for other missions.

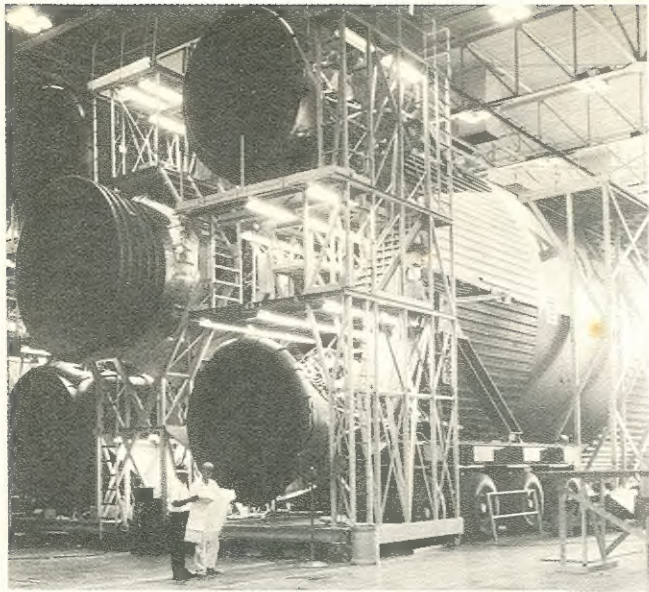
The Saturn V was developed as a new general purpose launch vehicle in the middle range of several configurations under consideration in 1962. It can perform earth orbital missions through the use of the first two stages, while all three stages are used for lunar and planetary expeditions. The first stage is powered by five F-1 engines, which burn kerosene and liquid oxygen to produce more than 7.5 million pounds of thrust. The upper stage engines burn liquid hydrogen and liquid oxygen.

A large network of production, assembly, testing, and launch facilities was prepared for production of the Saturn V. The stages are assembled and checked out in a huge Vehicle Assembly Building, then transported in an upright position to the launch site, more than three miles away.

The Saturn V, including the Apollo spacecraft, is 363 feet tall. Fully loaded, the vehicle weighs some 6.4 million pounds.

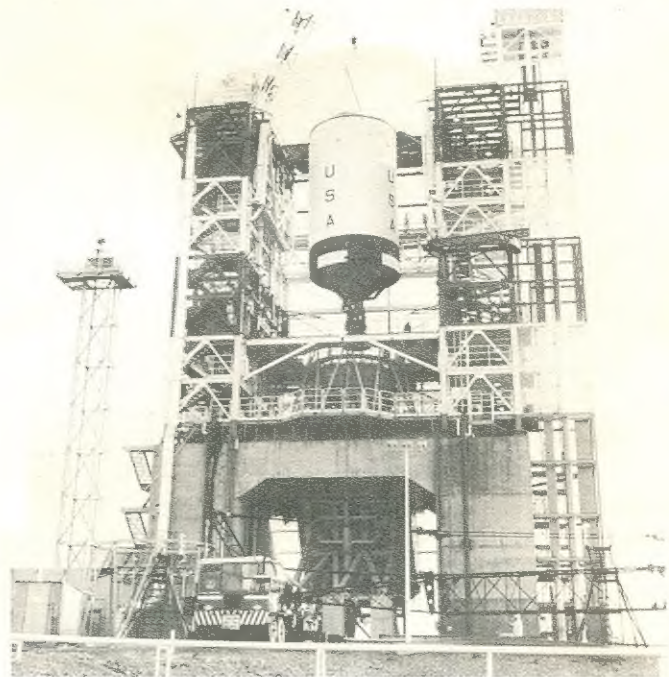
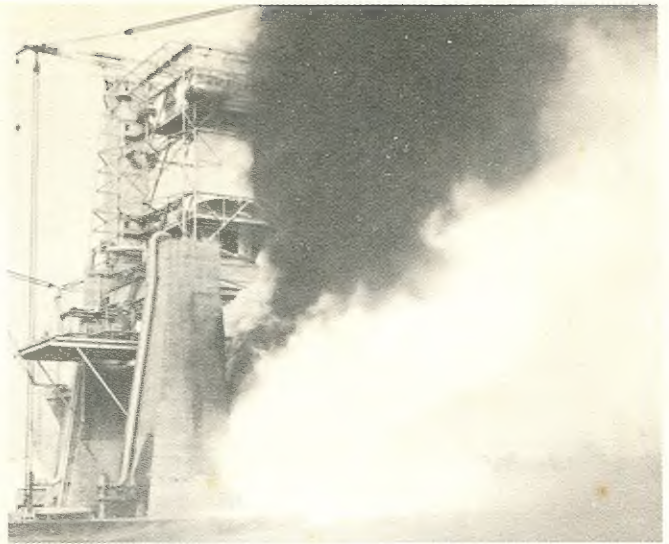
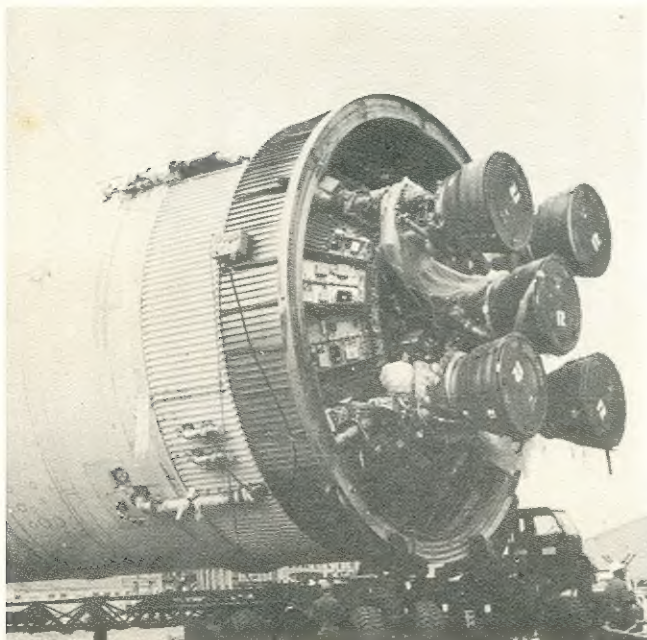


THE 363-FOOT HIGH APOLLO 13 SATURN V SPACE VEHICLE CARRYING ASTRONAUTS JAMES A. LOVELL, JR., JOHN L. SWIGERT, JR., AND FRED W. HAISE, JR., ON APRIL 11, 1970.



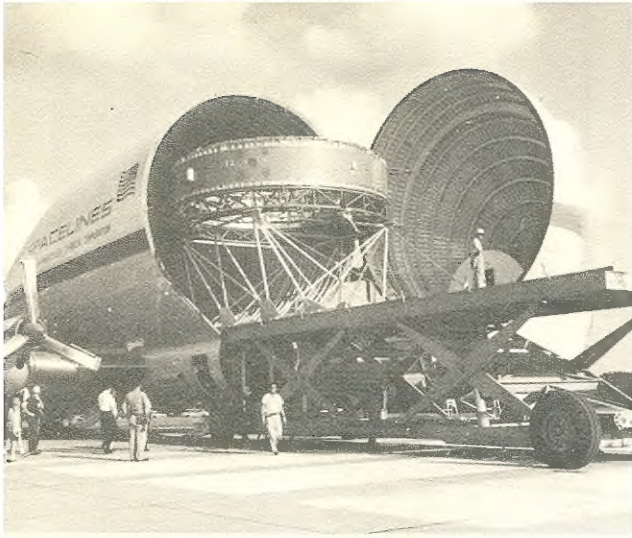
The Marshall Center and The Boeing Co. jointly developed the first stage of the Saturn V. Powered by five Rocketdyne F-1 engines, this stage lifts the entire vehicle and Apollo spacecraft from the launch pad. Within 2-1/2 minutes the vehicle is 38 statute miles high, 50 miles downrange, and traveling at 6,200 miles per hour.

The second stage, powered by five J-2 engines that burn liquid hydrogen and liquid oxygen, is provided by the North American Rockwell Corporation. Its engines ignited in flight after the first stage drops away, the second stage performs for 6-1/2 minutes, reaching a height of 115 statute miles, 935 miles downrange, and traveling at 15,500 miles per hour.



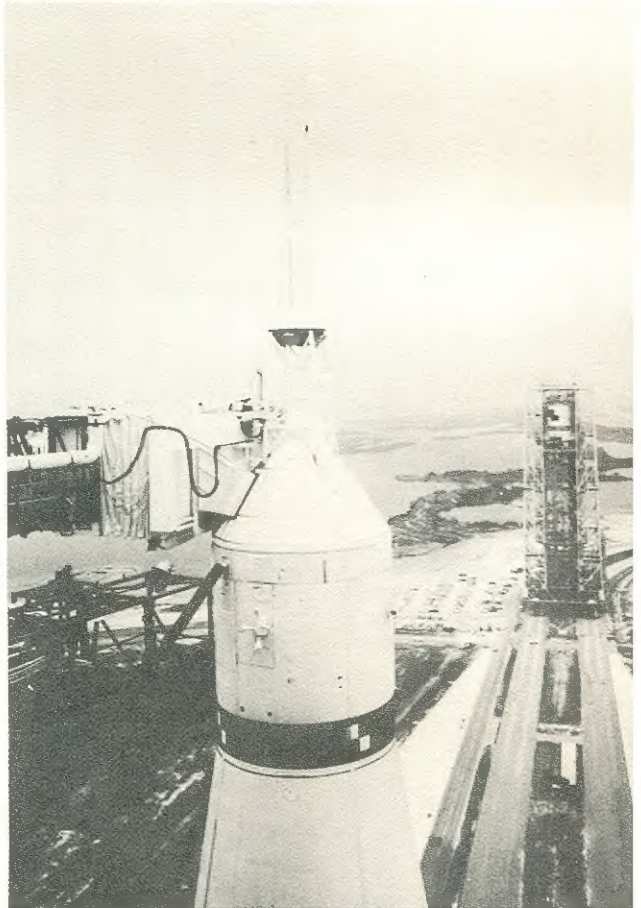
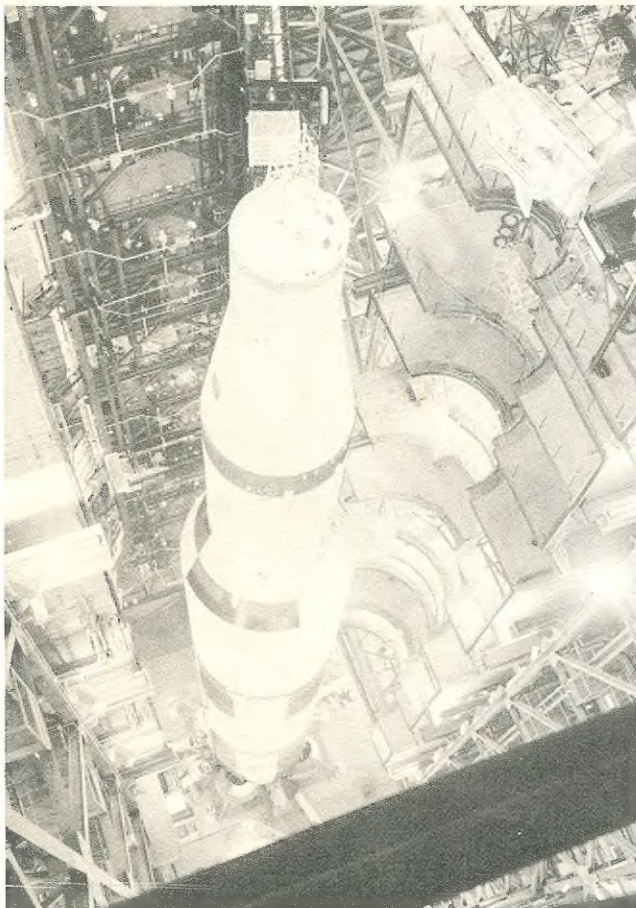
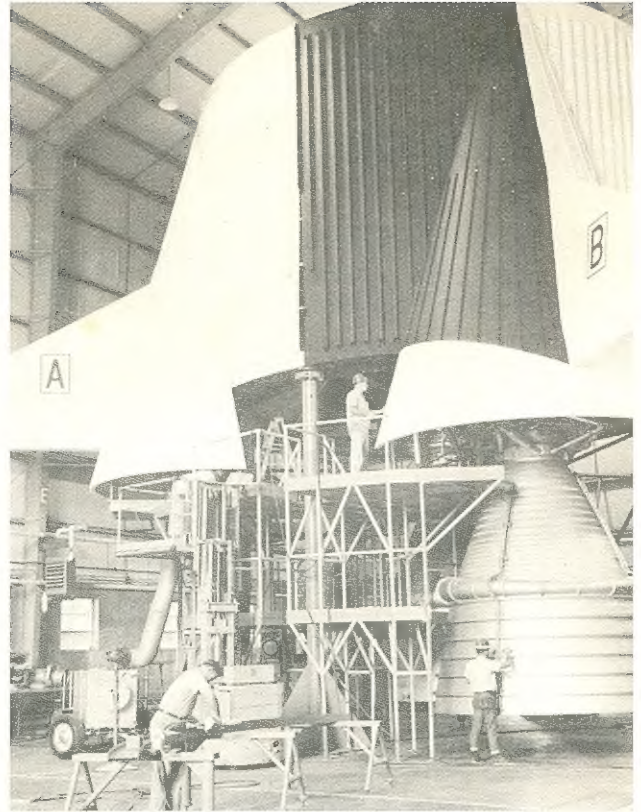
At this point the Saturn V's single engine third stage is ignited, burning for about two minutes to place itself, the instrument unit, which contains the guidance system, and the Apollo spacecraft into orbit at an altitude of 115 miles and a speed of almost 17,500 miles per hour. After a thorough checkout of equipment in earth orbit, the engine is reignited and burns for 5-1/2 minutes to reach the lunar transfer velocity of 25,000 miles per hour, enough to escape earth orbit and start out into space.

The McDonnell Douglas Astronautics Co. provides the Saturn V's third stage. It is the basis in the Skylab Program for a workshop in space for three men, scheduled for launching in late 1972. After the propulsion system is removed, the stage is fitted on the ground with equipment that permits three astronauts to live and work in space for as long as 56 days.



The Saturn V's instrument unit, which directs the vehicle in flight, is provided by International Business Machines Corporation.

Directly above the instrument unit is the Apollo spacecraft, which is the responsibility of the Manned Spacecraft Center at Houston. The spacecraft consists of the lunar module, the service module, the command module, and the launch escape system. Total height of these items is about 80 feet.



Saturn V Flight Record

(Launch vehicles 501 through 508, in consecutive order.)

- Nov. 9, 1967 -- Apollo 4 mission. First flight unmanned, into earth orbit. Apollo spacecraft's command module re-entered earth's atmosphere satisfactorily.
- April 4, 1968 -- Apollo 6. Second unmanned earth orbital flight. Despite propulsion difficulties in the second and third stages of the launch vehicle, the mission was rated 80 per cent successful, and the Apollo spacecraft was tested satisfactorily in an alternate trajectory.
- Dec. 21, 1968 -- Apollo 8. First manned flight of Saturn V. Astronauts Frank Borman, James A. Lovell, Jr., and William A. Anders made mankind's first orbits of the moon.
- March 3, 1969 -- Apollo 9. Astronauts James A. McDivitt, David R. Scott, and Russell L. Schweickart tested the Apollo spacecraft during 151 orbits of the earth, including 40 minutes of EVA. First flight of LM.
- May 18, 1969 -- Apollo 10. Second manned circumlunar flight, with Astronauts Thomas P. Stafford, John W. Young, and Eugene A. Cernan. Lunar module piloted within 9.26 miles of moon's surface without landing.
- July 16, 1969 -- Apollo 11. First manned lunar landing made on July 20. Astronauts Neil A. Armstrong and Edwin E. Aldrin, Jr., on lunar surface, spent 2.8 hours outside lunar module in Sea of Tranquility, while Michael Collins orbited overhead in the command module.
- Nov. 14, 1969 -- Apollo 12. Second lunar landing, made in Ocean of Storms. Astronauts Charles Conrad, Jr., Richard F. Gordon, and Alan L. Bean. Two extravehicular periods, with several scientific experiments deployed.
- Apr. 11, 1970 -- Apollo 13. Astronauts James A. Lovell, Jr., Fred W. Haise, Jr., and John L. Swigert circled the moon, without landing, and returned to earth after trouble with the service module of the Apollo spacecraft.

